

unpatentable over Shizuka as obvious in view of Kazuo et al. (JP 356146989A). Applicant respectfully traverses these rejections.

With respect to the rejection under 35 U.S.C. §112 as failing to comply with the enablement requirement, the Examiner states that the claimed subject matter of "the wick structure is fabricated from a material with a melting points lower than those of materials for fabricating the tubular member and the support member" is not adequately described in the specification. Applicant disagrees. In the Specification, at least one example is given, where a wick structure is fabricated using phosphorus bronze while the support member and the tubular member are fabricated using pure copper. (See page 4, lines 6-11 of the Specification) Traditionally, Cu, or Al has been used to build the tubular member of a heat pipe, but a killed person in the art knows that many different metals and their derivatives can be used to form the tubular member. Meantime, a plurality of possible materials can be used for constructing the wick. A skilled person can easily look up relevant references and select a possible combination of suitable materials for the tubular member, the support member and the wick of a heat pipe as long as he follows the suggestions of this invention by picking up the material to be used for a wick has a lower melting point than the material to be used for the tubular member and the support member. Which materials can be used for a heat pipe are well known facts for a skilled person in the art, this invention provides a guiding line for getting a better attachment between the wick layer and the inner surface of the tubular member.

With respect to the rejection under 35 U.S.C. §102(b) as being anticipated by Kitazawa, Applicants respectfully submit that there is no teaching, suggestion or motivation within the prior art as the combination of features recited in Applicant's claims. Claim 1 cites:

1. A heat pipe structure, comprising:
a hollow tubular member;
a support member disposed in the hollow tubular member; and
a wick structure supported by the support member and attached to an

interior wall of the tubular member; wherein the wick structure is fabricated from a material with a melting points lower than those of materials for fabricating the tubular member and the support member.

(Emphasis added)

Focusing on "wherein the wick structure is fabricated from a material with a melting points lower than those of materials for fabricating the tubular member and the support member vibrating the container" as asserted in independent claim 1. Kitazawa discloses a particular heat pipe used in a fixation roller for electrophotographic apparatus. The diameter of the heat pipe is 6 – 8 mm and the wall thickness in the range of 0.3 to 0.5 mm (See column 3, lines 26-28).

Kitazawa also indicates that if the wall thickness is thinner than 0.2mm his heat pipe structure may be damaged due to the pressure of the heat expansion and if the wall thickness is exceeds 0.6 mm that will cause difficulties. (Column 3, lines 44 - 49) Moreover, the fluid content is 7 – 40 % of the inner volume of the heat pipe. If the fluid amount exceeds 40%, the wall of the heat pipe is prone to rupture in the event of freezing. Kitazawa further discloses a spiral grooves formed on the inner surface, which is fitted with wick, prepared by bending and twisting phosphor bronze wires to form a hairpin shape. (See figure 3 and column 5, lines 5 -10) The heat pipe structure of Kitazawa comprises a hollow tube, spiral grooves formed on the inner surface, a wick and encapsulated fluid. The Kitazawa heat pipe was designed for a specific usage for electrophotographic apparatus, in which whether the wick structure attaching to the inner wall of the pipe tube is not an important issue.

Furthermore, the heat pipe works with or without the support member (the inner grooves. (column 4, lines 9-12) Kitazawa doesn't teach or disclose selecting materials with different melting points for the tubular member, the support member and the wick structure as the claim 1 of the current application does. Kitazawa merely discloses a heat pipe consisting of a tubular, may be a spiral grooves (a support member) and a wick. Such structure itself doesn't teach how

to improve the attachment of the wick structure to the inside wall of the heat pipe.

In regards to the rejection of claims 1-2, and 4-5 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Shizuka, Applicant disagrees. Shizuka uses Cu, Al, etc., as the material for outer container pipe and inner pipe and uses glass fibers or metal fibers, e.g., of Cu, Al, or stainless Steel as the material for his wick layer. Shizuka specifies few materials, which can be used as a wick material when Cu, Al are used for the outer and inner pipe. Nevertheless, to provide a better attachment between the wick layer and the inside surface of the outer pipe, Shizuka does not teach or disclose a general rule for materials selection as this application has discovered. Based on the current invention, the glass fibers or metal fibers wick layer can be replaced with other suitable material as long the new material for the wick has a lower melting point than the outer pipe and the inner pipe have. If a heat pipe using glass fibers or metal fibers for the wick, suitable materials other than Cu, or Al can be used according to this invention. As long as the material selected to be used for the tubular member or the support member has a higher melting point the glass fibers or the metal fibers does. Then the heat pipe made of these materials will have a good attachment between the wick layer and the inner surface of the outer pipe.

Therefore, Applicant respectfully submits that the features of claims would not be obvious to one skilled in the art. The standard for obviousness is described in a recent case, In re Dance, 48 USPQ2d 1635 (CAFC 1998), as follows.

To establish a *prima facie* case of obviousness based on a combination of the content of various references, there must be some teaching, suggestion or motivation in the prior art to make the specific combination that was made by the applicant. *In re Raynes*, 7 F.3d 1037, 1039, 28 USPQ2d 1630, 1631 (Fed. Cir. 1993); *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Obviousness can not be established by hindsight combination to produce the claimed invention. *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). As discussed in *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985), it is the prior art itself, and not the applicant's achievement, that must establish the obviousness of the combination. *In re Dance*, 48 USPQ2d 1635, 1637 (CAFC 1998).

(Emphasis added)

In regards to the rejection of claims 2-4, and 7 under 35 U.S.C. §103(a) as being unpatentable over Shizuka in view of Han et al., and the rejection of claims 2-4 under 35 U.S.C. §103(a) as being unpatentable over Shizuka in view of Kazuo, based on the discussion of the differences between Shizuka and the current application in the above paragraphs, Applicant respectfully submits that not all elements cited in Applicant's claims are taught or suggested within the prior art or their combination. Focusing on "wherein the wick structure is fabricated from a material with a melting points lower than those of materials for fabricating the tubular member and the support member" (element of the independent claim 1) and "wherein the material for fabricating the support member has the melting point lower than that of the material for fabricating the tubular member." (element of claim 6) Therefore, Applicant respectfully disagrees with the Examiner's rejections.

If the Examiner believes that a further telephonic interview will facilitate allowance of the claims, he is respectfully requested to contact the undersigned at (610) 446-5886. For the reasons stated above, Applicants respectfully assert that the pending claims are in condition for allowance. Reconsideration and allowance of the pending claims are respectfully requested.

Respectfully submitted,

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